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for on 11/6/06

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Title: **Open Wireless Architecture for Fourth Generation Mobile Communications**
Application No. **10/709,485**
Art Unit: **2617**
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Dear Mr. Fox and Mr. Appiah:

In my official response to your office action on October 18th, 2006, I enclosed "The Amendment to the Claims" at the end of the response. However, when I checked the USPTO website today, this "Amendment to the Claims" is missing in PAIR.

I do not know why it got lost in your database, and therefore resend this part of "Amendment to the Claims" to make the response complete.

I hope this time everything is OK, and please let me know if any questions.

Yours truly,

Wei Lu 11/6/06

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Amendment to the Claims

Claim 1 (Currently Amended)

An open wireless architecture (OWA) for fourth generation mobile communications said system comprising:

- a) a wireless communication terminal device supporting various different wireless ~~standards~~ (air interfaces) in the same device with same unique identifier and capable of communicating with other devices, systems or networks through a wireless medium ~~or over the air network,~~
- b) an advanced computer system equipped with full networking facilities to access various different backbone networks either through wireline networking interfaces or ~~sometimes~~ through broadband wireless access systems,
- c) an advanced transceiver system supporting various different air interfaces to interconnect said wireless communication terminal device, ~~etc~~ through the air link,
- d) said transceiver system connected to said computer system to construct the base-station as a whole,
- e) said wireless terminal device ~~can also~~ connected to different wireline networks through its networking interfaces in the said wireless terminal device,
- f) said base-station ~~can~~ connected to other base-station either over the wireline networks or over broadband wireless access system through said computer system, or by over-the-air networks through said transceiver system,
- g) said wireless terminal device ~~can also~~ connected to other wireless terminal device through the air link in an ad-hoc mode ~~in case of special situations.~~

Claim 2 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of claim 1 wherein: both said wireless terminal device and said base-station further comprising:

- a) an open processing engine ~~to~~ processing the signals and protocols of various different air-interfaces (~~including user-defined air interface~~) for over-the-air networking and transmission,
- b) a reconfigurable digital converter ~~to~~ transforming the received signals to the digital base-band signals and vice versa, and connected to said open processing engine,
- c) a programmable radio frequency (RF) module and smart antenna processing module of different frequencies ~~to~~ supporting different air-interfaces, and connected to said digital converter,
- d) a software definable module (SDM) containing parameters, algorithms and protocols; ~~etc~~ of some wireless air-interfaces to be stored in an external memory card or downloaded from networks,
- e) an open wireless BIOS (basic input/output system) structure capable of providing the common and open interfaces to said processing engine, said digital converter, said RF module and said SDM, ~~etc.~~

Claim 3 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of claim 1 wherein: both said wireless terminal device and said base-station further comprising:

- a) a system software module ~~to~~ supporting dynamic spectrum management, spectrum sharing and resource management to increase spectrum efficiency and optimize the system performance,
- b) a convergence layer module ~~to~~ converging wireline and wireless networks and services, as well as transmission convergence, ~~etc.~~,
- c) a configuration management module ~~to~~ enabling flexible system re-configuration when wireless air-interfaces changing, wireline networking changing or system settings changing, ~~etc.~~

Claim 4 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device capable of system software running upon the system hardware directly while the application soft-ware executing on the real-time OS (operating system) standards through said open wireless BIOS.

Claim 5 (Currently Amended)

A system as recited in claim 2 wherein said open processing engine decodes, de-channelizes and demodulates the base-band channel signals and control signals of said various air-interfaces into detailed digital signaling, traffic and control information, ~~and vice versa.~~

Claim 6 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured and re-programmed as wireless router, mobile soft switch or wireless gateway, ~~etc.~~

Claim 7 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured to be ~~portable and/or mobile as well~~ for military applications or special industrial applications. ~~In that case, that the said computer system connectsing to the backbone networks through said broadband wireless access systems instead of said wireline networking interfaces.~~

Claim 8 (Original)

A system as recited in claim 1 wherein said wireless terminal device and said base-station can communicate each other over said various different air interfaces including time-division multiple access (TDMA), code-division multiple access (CDMA), frequency-division multiple access (FDMA) or other user-defined interfaces.

Claim 9 (Original)

A method as recited in claim 8 detecting said various different air-interfaces for said wireless terminal device and said base-station, said method comprising:

- a) performing initial channel processing from the received signals, or
- b) scanning frequency carrier from the received signals, or
- c) performing different decoding scheme from the received signals, or
- d) performing different demodulation scheme from the received signals, or
- e) running user-defined detecting technologies.

Claim 10 (Currently Amended)

A method as recited in claim 1 connecting said transceiver system and said computer system through open software structures, comprising:

- a) open operating systems supporting Windows, Linux or user-defined,
- b) open resource management covering spectrum, bandwidth, channels, capacity, processors, power, storage and services, ~~etc~~,
- c) open communication application software enabling user-friendly programming and services,
- d) common objects library and functional components defining the converged processing elements,
- e) open configuration management supporting system reconfiguration in base-band parts, RF parts, antenna parts and networking parts, ~~etc~~.

Claim 11 (Currently Amended)

A system as recited in claim 2 wherein said open wireless BIOS defining the basic interface structure for the said various different air-interfaces/~~wireless standards (either common standards or user-defined)~~, said ~~standards~~air-interfaces switching, said functional modules as well as switching between internal and/~~or~~ external said modules, ~~etc~~.

Claim 12 (Currently Amended)

A method as recited in claim 2 providing a smart antenna processing module for said OWA system, said method comprising:

- a) using antenna arrays to process radio signals in both space, ~~not only~~and time; to improve performance in presence of wireless fading and interference,
- b) using beamforming algorithm to increase received signal-over-noise-rate (SNR) for desired directions,
- c) using diversity algorithm to combat fading in order to work at less SNR,
- d) using interference mitigation method to maximally reuse the channel frequencies,
- e) using spatial multiplexing algorithms to increase data speeds, for example, MIMO (multiple-in and multiple-out), ~~etc~~ (MIMO).

Claim 13 (Currently Amended)

A system as recited in claim 2 wherein said software definable module in said wireless terminal device can be stored in or installed from said external memory card (~~or SIM-card~~), or downloaded from any available networking facilities of said wireless terminal device.

Claim 14 (Currently Amended)

A method as recited in claim 3 providing a convergence layer module for said OWA system, said method comprising:

- a) open service convergence including transparent integrated services across both wireline and wireless networks, ~~etc~~,
- b) open transport convergence including ~~IP (internet protocol)~~ (IP) enterprise convergence and All-IP end-to-end convergence, ~~etc~~,
- c) open transmission convergence including adaptive modulation, adaptive coding and adaptive equalization, ~~etc~~.

Claims 15-20 (Canceled)